$$\tfrac{1}{4}M\,.\,B^2\text{: and } \tfrac{1}{4}M\,.\,A^2.$$

We have therefore only to resolve these moments along the direction of the given right line and add the quantities,

$$Mq^2\text{:} \qquad \text{and } Mp^2,$$

q and p being now the distances of the right line from centre of the ellipse.

If the equation be transferred to the centre of the ellipse it becomes

$$ax^2+2bxy+cy^2+f' = 0,$$

whence $$-f' = \frac{b^2f+d^2c+e^2a-2bde-acf}{ac-b^2} = \frac{\varDelta}{ac-b^2}$$

If θ be the angle that the axis of x makes with the major axis of the ellipse, and if we put $N = \sqrt{[(a-c)^2+4b^2]}$, we have

$$\cos\theta^2 = \frac{N+(a-c)}{2N}\text{:} \qquad \text{and } \sin\theta^2 = \frac{N-(a-c)}{2N}.$$

We have also for the semi-axes

$$A^2 = \frac{\varDelta}{ac-b^2}\cdot\frac{2}{a+c+N}\text{:} \qquad B^2 = \frac{\varDelta}{ac-b^2}\cdot\frac{2}{a+c-N}.$$

The moment of inertia about a line parallel to the axis of x and passing through the centre of the ellipse is $\tfrac{1}{4}M.(B^2\cos\theta^2 + A^2\sin\theta^2)$, which becomes on reduction

$$\frac{M}{4}\cdot\frac{a\varDelta}{(ac-b^2)^2}\text{:} \qquad \text{and the required moment is}$$

$$\frac{M}{4}\cdot\frac{a\varDelta}{(ac-b^2)^2} + Mq^2.$$

For the moment about a line parallel to the axis of y we have, since the equation of the disk is symmetrical,

$$\frac{M}{4}\cdot\frac{a\varDelta}{(ac-b^2)^2} + Mp^2.$$

PROBLEMS.

---

276. By *O. L. Mathies, Reistertown, Md.*—Given the chord AC of a circle, the side AB of a right angled triangle constructed on AC as hypothenuse, and the length of a perpendicular from A upon the line joining the right angle at B with the centre of the circle; to find the radius of the circle.

277. By *W. E. Heal, Wheeling, Indiana.*—Solve, algebraically the eq'n

$$x^{17}-1 = 0.$$

278. By *Prof. E. J. Edmunds, New Orleans, La.*—A Chord AB of a circle, whose centre is at O, remains constantly parallel to itself; A and B are connected to the centre O, and on AO and BO, or those lines produced, M and N are taken so that $AM = BN = AB$. Required the locus of M and N.

279. By *Prof D. J. McAdam, Washington, Pa.*—If the earth be projected, when in perihelion, at right angles to a line joining the Earth and Sun, with a velocity sufficient to cause it to describe a parabola, how long would it take it to reach the orbit of Jupiter? The orbits of the Earth and Jupiter supposed in the same plane, both circles, and the radius of Jupiter's orbit five times that of the Earth.

280. By *Prof. J. Scheffer, Mercersb'g, Pa.*—Find the sum of the series

$$x\sin a - \frac{x^2 \sin 2a}{1.2} + \frac{x^3 \sin 3a}{1.2.3} - \frac{x^4 \sin 4a}{1.2.3.4} + \ldots \text{ to infinity},$$

$$1 - x\cos a + \frac{x^2 \cos 2a}{2.2} - \frac{x^3 \cos 3a}{1.2.3} + \frac{x^4 \cos 4a}{1.2.3.4} - \ldots \text{ to infinity}.$$

PUBLICATIONS RECEIVED.

On Meteoric Fire-balls Seen in the United States during the year ending March 31, 1879. By PROF. DANIEL KIRKWOOD. [Read before the American Philosoph. Soc., May, 1879.]

Thermodynamics. By HENRY T. EDDY, C. E., PH. D., University of Cincinnati. 132 pp. 12mo. D. Van Nostrand, Publisher. New York: 1879.

Key to the Universe, or a New Theory of its Mechanism. Founded upon, I. Continuous Orbital Propulsion, arising from the Velocity of Gravity and its consequent Aberration: II. A Resisting Ethereal Medium of Variable Density; with Mathematical Demonstrations and Tables. By ORSON PRATT, SEN. 118 pp. 8vo. Second Edition, from the first European Ed. On sale at the Historian's Office, Salt Lake City, Utah. Price, $1.50.

The American Journal of Mathematics, Vol. II, No. 2. Baltimore, Maryland. June, 1879. 90 pages, 4to.—The leading article of this No. is a very interesting paper of 60 pages by EMORY MCCLINTOCK, F. I. A., of Milwaukee, Wis., in which the author presents the "Outlines", "Suggestions in Detail" and "Summary" of a new calculus, which he names the Calulus of Enlargement.

ERRATA.

On page 91, line 2, from bottom, for tan $a(\beta - x)x^2$, read tan $2a(\beta - x)x^2$.
" " 122, " 14, for $(2 \div \sqrt{a}) \log (2 - \sqrt{2})$, read $(1 \div \sqrt{2a}) \log (1 - \sqrt{2})$.
" " 133, in the equations for r and u, 5th and 6th line from bottom, it is assumed that $s \div 2$ is reduced to the mean distance of the planet from the Earth.
" " 133, line 14, for equations, read equation.
" " 138, lines 2 and 3, transpose the signs before r, viz., read $-r$ &c., in line 2 and $+r$ &c., in line 3.
" " 147, line 19, for $b_0 = 0$, read $b_0 = 1$.